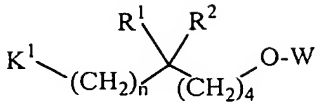
What is claimed is:

1. A compound of the formula IV:

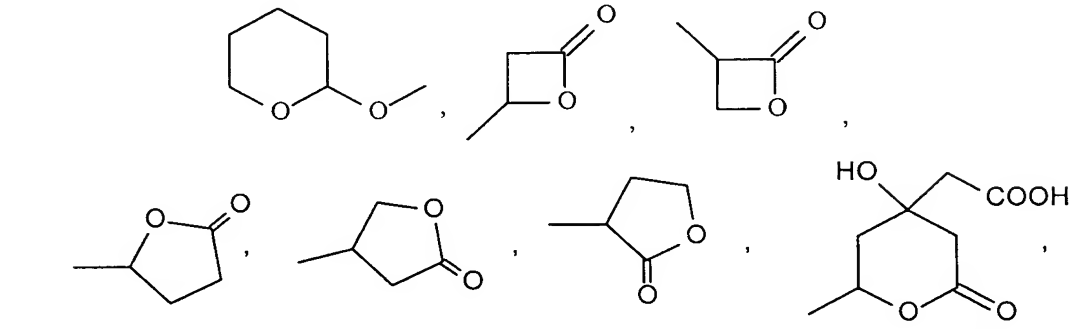


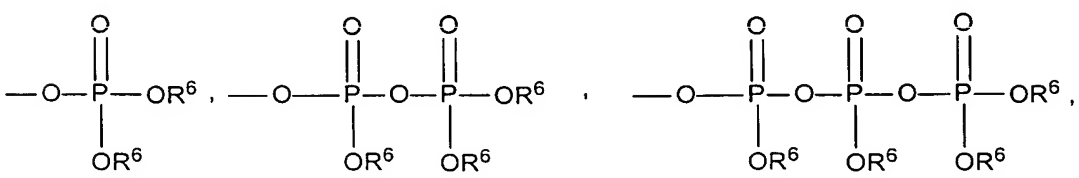
IV

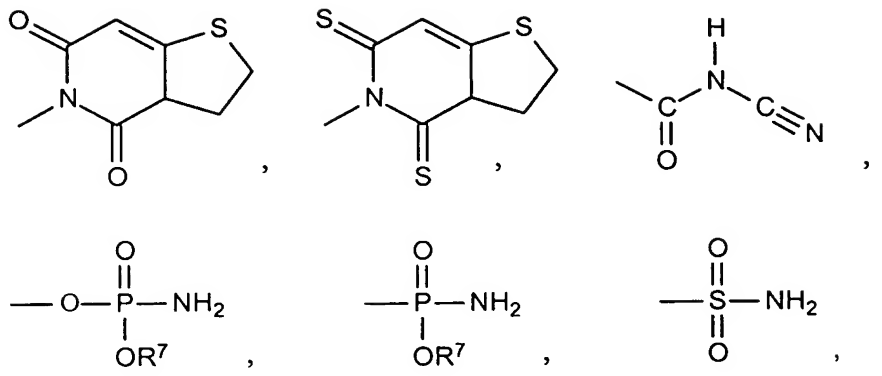
wherein:

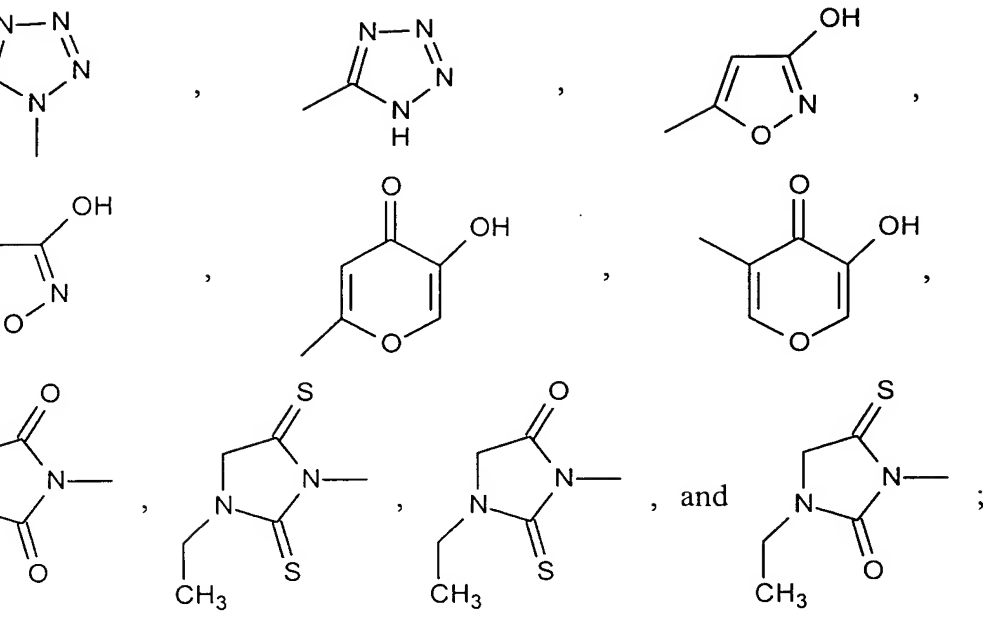
n is an integer ranging from 1 to 4;

K^1 selected from the group consisting of $-CH_2OH$, $-C(O)OH$, $-CHO$, $-C(O)OR^5$, $-OC(O)R^5$, $-SO_3H$,









R^1 and R^2 are independently selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, phenyl, and benzyl; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group and R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group, with the proviso that none of R^1, R^2, R^3, or R^4 is $–(CH_2)_{0–4}C\equiv CH$;

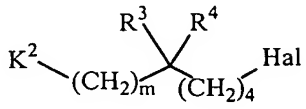
R^5 is selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl,

$(C_2–C_6)$alkynyl, phenyl, and benzyl;

each R^6 is independently selected from the group consisting of H, $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, and $(C_2–C_6)$alkynyl; and

W is selected from the group consisting of H and a hydroxy protecting group.

2. A compound of the formula V:

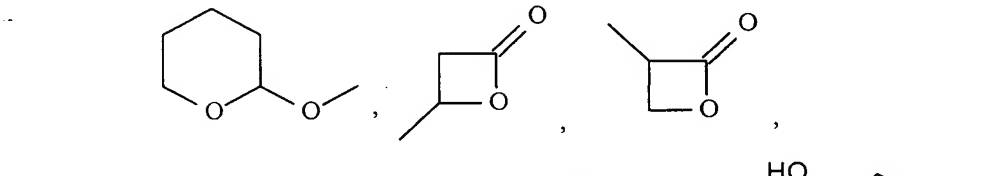


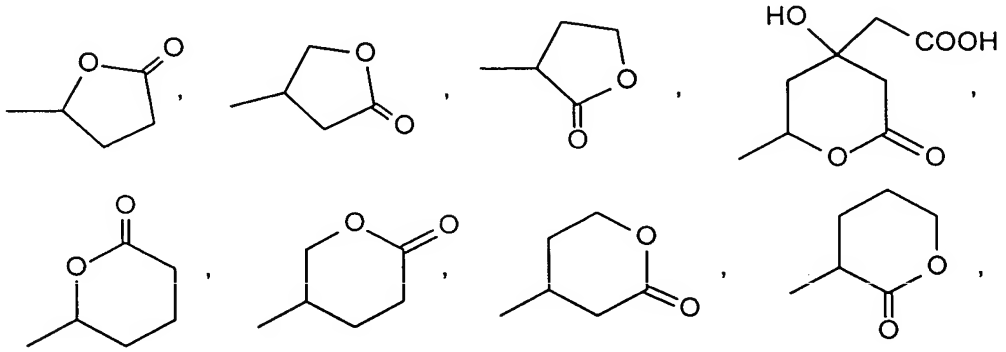
V

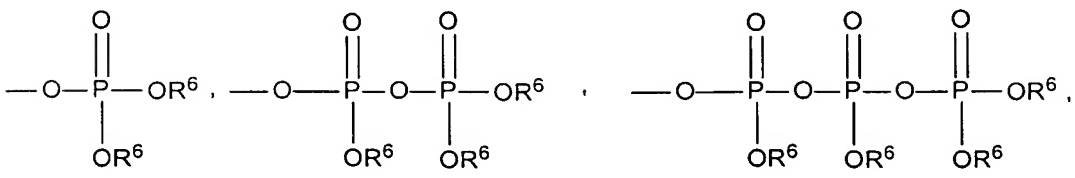
wherein:

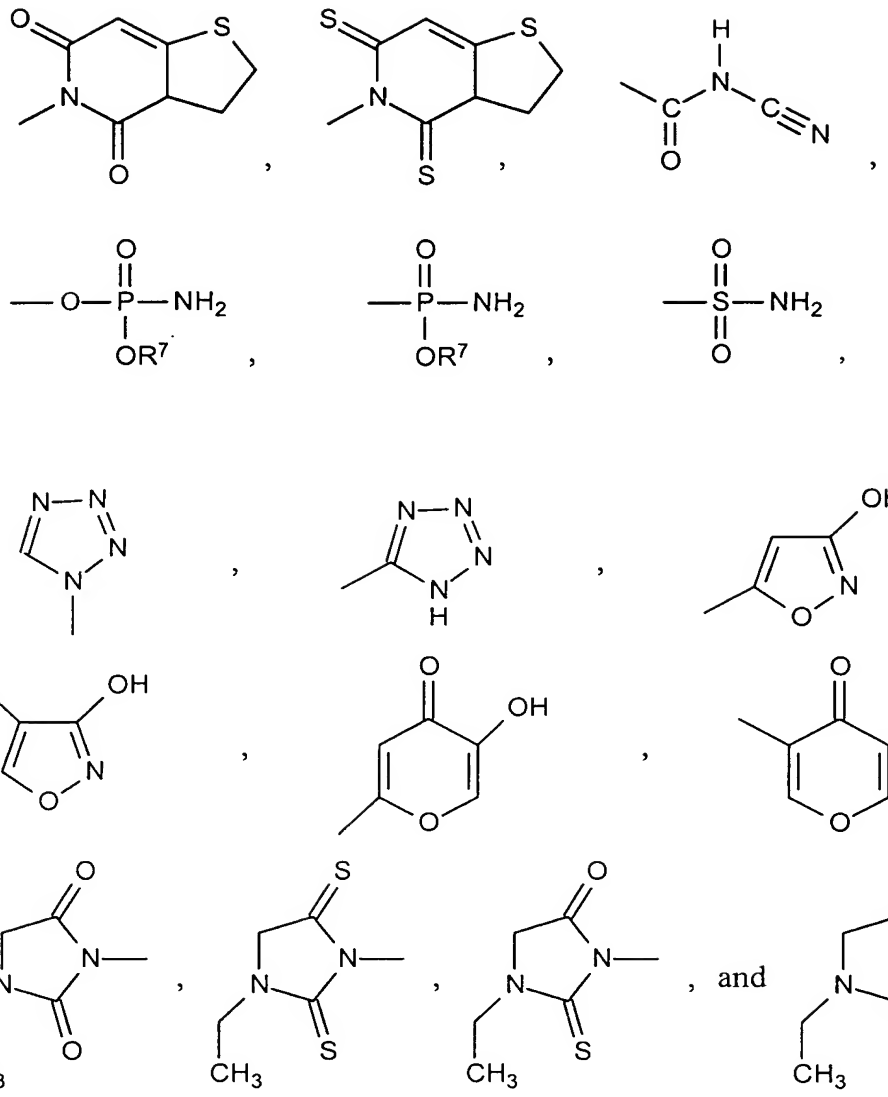
m is an integer ranging from 1 to 4;

K^2 selected from the group consisting of $–CH_2OH$, –C(O)OH, –CHO, $–C(O)OR^5$, $–OC(O)R^5$, $–SO_3H$,









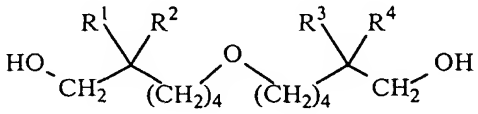
R^3, and R^4 are independently selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, phenyl, and benzyl; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group and R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group, with the proviso that none of R^1, R^2, R^3, or R^4 is $–(CH_2)_{0–4}C\equiv CH$;

R^5 is selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, phenyl, and benzyl;

each R^6 is independently selected from the group consisting of H, $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, and $(C_2–C_6)$alkynyl; and

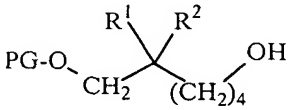
Hal is selected from the group consisting of chloro, bromo, and iodo.

3. A method for synthesizing a compound of a formula II:



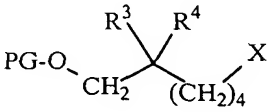
II

comprising: (a) contacting in the presence of a base a compound of a formula XXIV:



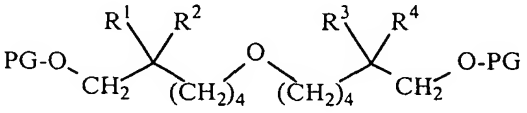
XXIV

with a compound of a formula XXVIII



XXVIII

to provide a compound of a formula XXIX



XXIX

and; (b) deprotecting the compound of the formula XXIX to provide the compound of the formula II, wherein:

R^1, R^2, R^3, and R^4 are independently selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, phenyl, and benzyl; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group and R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group, with the proviso that none of R^1, R^2, R^3, or R^4 is $–(CH_2)_{0–4}C{\equiv}CH$; and

PG is a hydroxy protecting group.

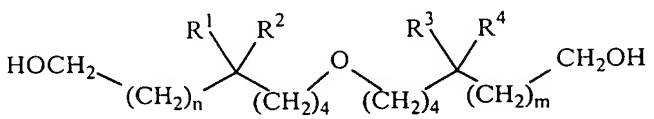
4. The method of claim 3, wherein the compound of the formula XXIV is contacted with the compound of the formula XXVIII in the further presence of an organic solvent.

5. The method of claim 3, where in PG is selected from the group consisting of methyl, methoxy methyl, methylthiomethyl, methoxyethoxymethyl, *bis*(2-chloroethoxy)methyl, tetrahydropyranyl, tetrahydrothiopyranyl, tetrahyrofuranyl, tetrahydrothiofuranyl, 1-ethoxyethyl, 1-methyl-1-methoxyethyl, t-butyl, allyl, benzyl, *o*-nitrobenzyl, triphenylmethyl, α-naphthyldiphenylmethyl, *p*-methoxyphenyldiphenylmethyl, 9-(9-phenyl-10-oxo)anthranyl, trimethylsilyl, isopropyldimethylsilyl, *t*-butyldimethylsilyl, *t*-butyldiphenylsilyl, tribenzylsilyl, and triisopropylsilyl.

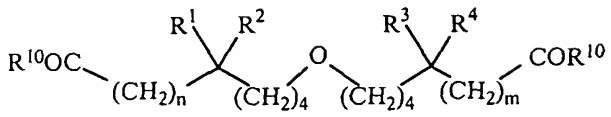
6. The method of claim 3, wherein PG is tetrahydropyranyl.

7. The method of claim 3, wherein the base is selected from the group consisting of methyllithium, *n*–butyllithium, *tert*–butyllithium, *sec*–butyllithium, phenyllithium, phenyl sodium, phenyl potassium, lithium amide, sodium amide, potassium amide, lithium tetramethylpiperidide, lithium diisopropylamide, lithium diethylamide, lithium dicyclohexylamide, sodium hexamethyldisilazide, lithium hexamethyldisilazide, sodium hydride, and potassium hydride.

8. A method for the synthesis of a compound of a formula III:



comprising contacting a compound of a formula VI



VI

with a reducing agent,

wherein:

R^1, R^2, R^3, and R^4 are independently selected from the group consisting of $(C_1–C_6)$alkyl, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, phenyl, and benzyl; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group; or R^1, R^2, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group and R^3, R^4, and the carbon to which they are attached are taken together to form a $(C_3–C_7)$cycloalkyl group, with the proviso that none of R^1, R^2, R^3, or R^4 is $–(CH_2)_{0–4}C≡CH$;

R^{10} is independently selected from the group consisting of –H, –OH, $(C_1–C_6)$alkoxy, $–(C_6)$aryloxy, $–O–(C_2–C_6)$alkenyl, $–O–(C_2–C_6)$alkynyl, halo; and

n and m are independent integers ranging from 0 to 4.

9. The method of claim 8, wherein the reducing agent is selected from the group consisting of hydrogen, borane, allane, lithium aluminum hydride, diisobutylaluminum hydride, and sodium borohydride.

10. The method of claim 8, further comprising the step of adding an aqueous proton source.